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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/735,009	12/12/2000	Charles E. Boardman	24-BR-6010	3389

7590 05/22/2003

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EXAMINER

PALABRICA, RICARDO J

ART UNIT	PAPER NUMBER
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3641

DATE MAILED: 05/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

8K

Office Action Summary	Application No.	Applicant(s)	
	09/735,009	BOARDMAN ET AL.	
	Examiner	Art Unit	
	Rick Palabrica	3641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 12-24, 34 and 35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 25-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's amendment in Paper No. 14, which revises claims 1, 6, 7, 8, 9, 10, 11, 25, 28, 29, and 30-33, is acknowledged.

2. Applicant traversed the rejection of claims as being unpatentable over the combination of Koutz with either Interrante et al. or Wentorf, Jr. As discussed below, applicant's arguments have been fully considered but they are not persuasive.

Applicant alleges that his claimed system does not include a closed loop heating circuit that utilizes a working fluid. The examiner disagrees. Note that this exclusivity feature is not recited in rejected claims(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Note further that the claims recite the inclusive, open-ended transitional term "comprising", which is synonymous with "including", "containing", or "characterized by", and does not exclude additional, unrecited elements. See, e.g., MPEP 2111.03 and *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997) ("Comprising" is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim).

Applicant alleges that the steam generator of the claimed invention does not read on heat exchanger 38 of Koutz because "the heat transfer medium of the reactor loop

14 in Koutz does not pass through heat exchanger 38.” The examiner disagrees. As stated in section 5 below, the limitation in amended claims 1 and 25 regarding “a non-radioactive secondary loop comprising a recirculated heat transfer medium” reads on the non-radioactive secondary heat loop of Kuntz comprising the intermediate heat exchanger 20 and heat exchanger 38. Note that this secondary loop is a heat transfer medium because heat transfer occurs in several parts of the system (e.g., across heat exchanger 38 and heat exchanger 24). There is also recirculation of the heat transfer medium in this loop because it is a closed loop.

Applicant alleges that in the claimed system, the feed water “passes through the steam generator along with the heat transfer medium of the reactor secondary heat loop.” He further alleges that in Koutz, the “feed water input line is not coupled to the steam generator connected to the reactor secondary heat loop, and the feed water does not pass through the heat exchanger connected to the reactor secondary heat loop.” The examiner disagrees. As stated in the previous paragraph, the steam generator in Koutz (i.e., heat exchanger 38) is connected to the secondary heat loop and note from his figure that both the heat transfer medium and the feed water pass through said steam generator, with the heat transfer medium passing on the primary side and the feed water passing on the secondary side.

Applicant also alleges that the “feed water line is not coupled to the heat pump (topping heater).” The examiner disagrees. As stated in the previous Office Action, applicant’s topping heater reads on Koutz’ combination of heaters 4A and 5A. Koutz’ figure clearly shows the feed water passing these two heaters.

3. Claims 6-10 and 28-32 are objected to because they contain the following informality: "toping heater" Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 6-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6, which depends from claim 5, contains a functional phrase or clause such as the "wherein" clause, the content of which does not inherently follow from the actual structure recited in claim 5. Thus, the scope of the claims and/or the metes and bounds thereof cannot be determined. Said clauses accordingly raise a question as to the limiting effect of the language therein on the claims (see MPEP 2106.II.C).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-11 and 25-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,576,783 to Koutz in view of either one of Interrante et al. (U.S. 3,821,358) or Wentorf, Jr. (U.S. 3,842,164). Koutz discloses the applicant's claims except for the use of a liquid metal reactor and a gas heater to raise the temperature of the feed water heated by a liquid metal reactor, or the inclusion of a desalination plant in the system.

Koutz discloses the same inventive concept as the applicant of augmenting the temperature of a working fluid heated by a nuclear reactor to provide a temperature necessary to carry out thermal decomposition of water to produce hydrogen (see column 1, 2nd paragraph and column 2, lines 30+). Koutz discloses a high temperature gas cooled reactor with a reactor core (12) that heats the radioactive, primary coolant to approximately 1350°F. Koutz also discloses a steam turbine that drives an electric generator (see column 3, lines 27-30). Koutz further teaches the use of at least three regenerative heat exchangers in his system (see, for example, column 2, lines 55-59; column 3, lines 20-25).

Applicant's claim language reads on Koutz' invention as follows: "non-radioactive secondary loop comprising a recirculated heat transfer medium" reads on the secondary loop comprising intermediate heat exchanger 20 and heat exchanger 38; "feed water" reads on the "feed water supply", "steam generator" reads on "heat exchanger 38", "topping heater" reads on the combination of heaters "4A and 5A", and "high temperature cracking system" reads on process chamber 30." Note that the feed water input line is in flow communication with the steam generator, the topping heater, and

high temperature water cracking system. Also, note that the feed water is dissociated into hydrogen and oxygen in the high temperature cracking system. See also the discussion in section 2 above.

Either one of Interrante et al. or Wentdorf, Jr. teach the use of either a high temperature gas reactor or a liquid metal reactor as a heat source for thermochemical production of hydrogen and oxygen (e.g. see column 2, lines 28+ in Interrante et al. or column 2 lines 45+ in Wentdorf, Jr.).

One having ordinary skill in the art would have recognized that substituting a liquid metal reactor as primary heat source for the gas-cooled of Koutz would have been prima facie obvious.

As to the limitations regarding the gas-fired heaters, regenerative heat exchangers and gas desalination plant, which the examiner stated on page 5 of his 3/19/02 Office Action as well known in the art, said statement was not seasonably traversed by the applicant. Therefore, these objects of the well-known statement are taken to be admitted prior art. See MPEP 2144.03.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system, as disclosed by Koutz, by the teaching of either one of Interrante et al. or Wentdorf, Jr., and admitted prior art, in order to have a system for generating hydrogen comprising feed water, liquid metal reactor, steam generator, high temperature water cracking system, and gas topping heater, as this is no more than the use of well known techniques/design in the nuclear art, and the substitution of one system component by another well known system component.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Palabrica whose telephone number is 703-306-5756. The examiner can normally be reached on 7:00-4:30, Mon-Fri; 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on 703-306-4198. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7687 for regular communications and 703-305-7687 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

RJP
May 20, 2003

MICHAEL
SUPERVISOR